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TECHNICAL

LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE



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High Growth Rate Maintained by 140-Year-Old Red Pine

The oldest active experiment of the Lake States Forest Experiment Station in northern Minnesota is a red pine thinning study on the Bena District of the Chippewa National Forest. Although originally a regeneration study, the experiment is now of interest principally because of the high sustained growth rate of the comparatively old red pine overstory. The experiment began in 1926 in a predominantly red pine stand then about 105 years old. The site index is 52 feet at age 50, which is about average for Minnesota.

The experiment consists of three plots, which have been thinned seven times in 33 years. The first thinning in 1926 reduced their basal areas to between 125 and 145 square feet per acre. The next six thinnings brought the basal area levels for each plot down lower. The average after thinning was 78 square feet per acre for plot 2 (range 70 to 91), 94 for plot 3 (range 88 to 106), and 120 for plot 4 (range 110 to 132). Plot 1 was clear cut in 1936 as part of the regeneration study.

The board-foot summaries for the 33-year period are given below:

<u>Item</u>	<u>Board feet per acre, Scribner Decimal C log rule</u>		
	<u>Plot 2</u>	<u>Plot 3</u>	<u>Plot 4</u>
Volume growth (1926-59)	16,440	16,760	15,620
Volume cut (1926-59)	21,480	22,920	20,520
Present volume (1959)	12,810	14,870	18,600

There is apparently little difference between the growth rates of any of the three stand densities used in this experiment. Plots 2 and 3 differ in growth by only 320 board feet in 33 years. Plot 4 has grown 1,140 board feet or 7 percent less than plot 3, which had the highest growth rate. Actually, the contrast in basal area density between any of the three plots is not great.

The most interesting aspect of the study has been the high sustained growth rates of this mature red pine. Plots 2 and 3 have averaged almost 500 board feet per acre per year for the past 33 years, while plot 4 has averaged 475 board feet. There has been no conspicuous decline in growth with advancing age. During the past 5 years the plots have grown an average of 440 board feet per acre per year.

(over)

Growth during the 33 years exceeds the present average standing volume of the three plots. It represents a fivefold increase over the growth that might have been predicted for the same span of years from a normal yield table.^{1/} During this 33-year period almost 22,000 board feet of timber per acre have been harvested in the form of thinnings.

This experiment will be continued for some years to see how growth behaves in relation to advancing stand age. The results to date raise additional questions about what should be considered a proper rotation for red pine. This stand is now at the oldest age (140 years) commonly suggested for red pine rotations, and yet it is still growing well.

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^{1/} Eyre, F. H., and Paul Zehngraff. Red pine management in Minnesota. U.S. Dept. Agr. Cir. 778, 70 pp. 1948.